Cont'd

switches are substantially simultaneously switched by an input signal applied to the primary.

## REMARKS

The applicants appreciate the Examiner's thorough examination of the application and request reexamination and reconsideration of the application in view of the preceding amendments and the following remarks.

The applicants have amended the specification as shown above under AMENDMENT C to correct minor informalities and to provide a more detailed description of the invention. No new matter has been introduced by the above amendments. The applicants also request correction to Figs. 1, 2, 3, 4, 5, 6, 7, and 8 as shown in the drawings attached hereto with red ink marking indicating the proposed changes. No new matter has been introduced by the proposed corrections to the drawings. Applicants will provide formal drawings at such time as the application is allowed by the Examiner.

The Examiner rejects claims 19-24, 26, 27, 31, and 33 under 35 U.S.C. §102(b) as being anticipated by Wood (HEXFET DESIGNER'S MANUAL). The Examiner also rejects claims 25, 28-30 under 35 U.S.C. §103(a) as being unpatentable over Wood in view of Dassonville. Because the applicants have cancelled claims 19-31 and 33, the Examiner's rejection of these claims under 35 U.S.C. §102(b) and §103(a) is now moot.

To advance prosecution, the applicants have added claims 34-59. The modulator as now claimed by the applicants in new claim 34 includes: 1) a transformer comprising a primary winding and a plurality of secondary windings; 2) a control driver for producing electrical control signals, the control driver being in electrical communication with the

primary winding and being in electrical communication with a source of electrical power; and 3) a plurality of switches, each switch having an input terminal pair and at least one output terminal pair, the input terminal pair being in electrical communication with a respective transformer secondary winding, and each switch having an input voltage limiting device in parallel with the input terminal pair, the input voltage limiting device providing a common defined voltage to each switch, wherein the plurality of switches are substantially simultaneously switched on by a time varying electrical control on-pulse produced by the control driver, the on-pulse being substantially of a first polarity and wherein the plurality of switches are substantially simultaneously switched off by a time varying electrical control off-pulse produced by the control driver, the off-pulse being substantially of a second polarity, the second plurality being opposite the first polarity. New independent claims 46 and 59 similarly recite an input voltage limiting device for providing a common defined voltage to each switch.

The robust module as now claimed by the applicants in independent claims 34 and 59 includes an input voltage limiting device connected in parallel with the input terminal pair of each switch which provides a common defined voltage to each switch. Claim 46 similarly includes an input voltage limiting device connected in parallel with the buffer input terminal pair and provides a common defined voltage to each retriggerable drive which is associated with a respective switch. The claimed voltage limiting device, such as secondary input clamps, e.g., back-to-back volt Zener diodes, in disclosed in Figs. 3, 7 and 8 of the subject application, attached hereto as Exhibits A, B, and C and indicated by arrows M, N, and O, respectively, provides a common defined voltage to each switch or retriggerable drive circuit. This unique feature results in a rugged high power module

which is protected from transient over-voltages which are unavoidable in practical system applications.

Moreover, the shared transformer primary signal of the subject invention is produced by what is substantially a controlled current source (i.e. it has a large output impedance) which in effect produces transformer action independent electromotive switching forces within the various modules comprising the array. Within each module the signal applied to the switch is positively clamped by the clamp (e.g., the claimed voltage limiting device as indicated by arrows M, N, and O of Exhibits A, B, and C, respectively). The result is that all the switches or retriggerable drive circuits in the module are always driven to a common, well defined voltage.

In sharp contrast, Wood does not teach, suggest, or disclose a module which includes an input voltage limiting device in parallel with the input terminal pair to provide a common defined voltage to each switch. Instead, the primary signal as described by Wood must be produced by what is substantially a controlled voltage source (i.e. the voltage source has a low output impedance; Wood actually discloses it as a pure voltage). An unavoidable consequence of this design is that small differences in core saturation characteristics would lead to significant differences in the final gate voltages for modules in a series array of primaries. The core magnetization and gate capacitances are notoriously different from component to component and batch to batch.

Therefore, Wood does not disclose, teach, or suggest each and every element of the applicants' invention as recited in independent claims 34, 46, and 59, namely, an input voltage limiting device for providing a common defined voltage to each switch or retriggerable drive circuit associated with each switch. Accordingly, a rejection of new

independent claims 34, 46, and 62 under 35 U.S.C. §102(b) would be improper.

Accordingly, independent claims 34, 46, and 59 are allowable and patentable under 35 U.S.C. §102(b) over Wood. Because claims 35-45 and 47-58 depend from allowable base claims, claims 35-45 and 47-58 are clearly patentable under 35 U.S.C. §102(b) over Wood.

Because Wood does not disclose each and every element of the applicants' invention, the combination of Wood and Dassonville does not disclose each and every element of the applicants' invention. Accordingly, a rejection of Wood in view of Dassonville under 35 U.S.C. §103(a) would be improper.

Moreover, Dassonville actually teaches away from the applicants' invention. The circuit as disclosed in Dassonville is designed to switch a series stack of Silicon Controlled Rectifiers (SCRs) (as shown in all the figures of Dassonville). In contrast, the applicants' invention includes a plurality of switches which are disclosed in one embodiment as field effect transistors (FET). (See claims 37, 49, 53; Figs 3, 7, and 8; page 4, line 19; page 10, line 13 – page 11, line 16; page 12, lines 7-18; page 13, lines 7-12; and page 18, line 3-11, of the applicants' specification). This distinction is important because an SCR is a closing switch only (i.e. can only become an electrical short upon command). In contrast, FET can be opened or closed as needed. Adding FET switches to the design of Dassonville would require extraordinary effort to ensure all the local control circuits were sufficiently equivalent to produce switching signals capable of making the switching of the FETs effectively simultaneous. If sufficiently low values of resistance of device R2 (See Fig. 2 of Dassonville) were used for balancing capacitance C1 (See Fig. 2 of Dassonville), the resistance would need to be excessively large to hold the gate

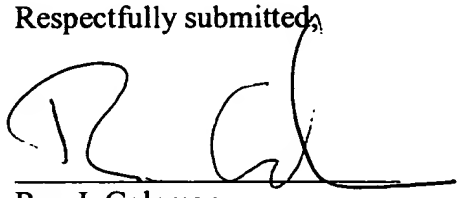
substantially constant between primary positive and negative pulses. A large value capacitance value of C1 would result in slow turn-on and turn-off of the device. If resistance R1 was used when the switch device is a FET, a large value R1 would allow the speed of turn-on to be determined by choice of R2 and C1, but would cause a slow and unpredictable turn-off to occur. This would generally be disastrous since it would likely result in damaging over voltage of the first device to turn off.

Accordingly, as shown above, Dassonville actually teaches away from the applicants' claimed invention.

Each of the Examiner's rejections has been addressed or traversed. Accordingly, it is respectfully submitted that the application is in condition for allowance. Early and favorable action is respectfully requested.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts, at (781) 890-5678.

Respectfully submitted,



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